

**QUICK REVIEW 2.1** (For help, go to Sections A.2. and P.4)

In Exercises 1–2, write an equation in slope-intercept form for a line with the given slope  $m$  and  $y$ -intercept  $b$ .

1.  $m = 8, b = 3.6$       2.  $m = -1.8, b = -2$

In Exercises 3–4, write an equation for the line containing the given points. Graph the line and points.

3.  $(-2, 4)$  and  $(3, 1)$       4.  $(1, 5)$  and  $(-2, -3)$

In Exercises 5–8, expand the expression.

5.  $(x + 3)^2$       6.  $(x - 4)^2$   
7.  $3(x - 6)^2$       8.  $-3(x + 7)^2$

In Exercises 9–10, factor the trinomial.

9.  $2x^2 - 4x + 2$       10.  $3x^2 + 12x + 12$

**SECTION 2.1 EXERCISES**

In Exercises 1–6, determine which are polynomial functions. For those that are, state the degree and leading coefficient. For those that are not, explain why not.

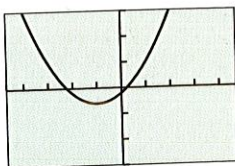
1.  $f(x) = 3x^{-5} + 17$       2.  $f(x) = -9 + 2x$   
3.  $f(x) = 2x^5 - \frac{1}{2}x + 9$       4.  $f(x) = 13$   
5.  $h(x) = \sqrt[3]{27x^3 + 8x^6}$       6.  $k(x) = 4x - 5x^2$

In Exercises 7–12, write an equation for the linear function  $f$  satisfying the given conditions. Graph  $y = f(x)$ .

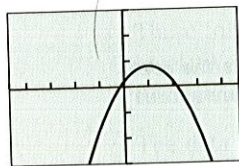
7.  $f(-5) = -1$  and  $f(2) = 4$   
8.  $f(-3) = 5$  and  $f(6) = -2$   
9.  $f(-4) = 6$  and  $f(-1) = 2$   
10.  $f(1) = 2$  and  $f(5) = 7$   
11.  $f(0) = 3$  and  $f(3) = 0$   
12.  $f(-4) = 0$  and  $f(0) = 2$

In Exercises 13–18, match a graph to the function. Explain your choice.

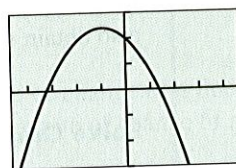
13.  $f(x) = 2(x + 1)^2 - 3$       14.  $f(x) = 3(x + 2)^2 - 7$   
15.  $f(x) = 4 - 3(x - 1)^2$       16.  $f(x) = 12 - 2(x - 1)^2$   
17.  $f(x) = 2(x - 1)^2 - 3$       18.  $f(x) = 12 - 2(x + 1)^2$



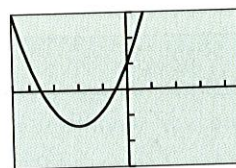
(a)



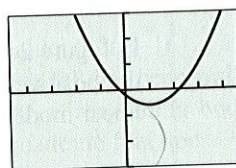
(b)



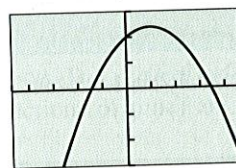
(c)



(d)



(e)



(f)

In Exercises 19–22, describe how to transform the graph of  $f(x) = x^2$  into the graph of the given function. Sketch each graph by hand.

19.  $g(x) = (x - 3)^2 - 2$       20.  $h(x) = \frac{1}{4}x^2 - 1$   
21.  $g(x) = \frac{1}{2}(x + 2)^2 - 3$       22.  $h(x) = -3x^2 + 2$

In Exercises 23–26, find the vertex and axis of the graph of the function.

23.  $f(x) = 3(x - 1)^2 + 5$       24.  $g(x) = -3(x + 2)^2 - 1$   
25.  $f(x) = 5(x - 1)^2 - 7$       26.  $g(x) = 2(x - \sqrt{3})^2 + 4$

In Exercises 27–32, find the vertex and axis of the graph of the function. Rewrite the equation for the function in vertex form.

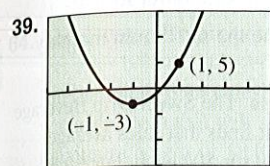
27.  $f(x) = 3x^2 + 5x - 4$       28.  $f(x) = -2x^2 + 7x - 3$   
29.  $f(x) = 8x - x^2 + 3$       30.  $f(x) = 6 - 2x + 4x^2$   
31.  $g(x) = 5x^2 + 4 - 6x$       32.  $h(x) = -2x^2 - 7x - 4$



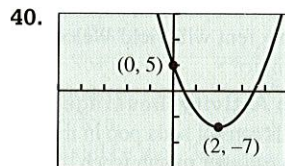
In Exercises 33–38, use completing the square to describe the graph of each function. Support your answers graphically.

33.  $f(x) = x^2 - 4x + 6$  34.  $g(x) = x^2 - 6x + 12$   
 35.  $f(x) = 10 - 16x - x^2$  36.  $h(x) = 8 + 2x - x^2$   
 37.  $f(x) = 2x^2 + 6x + 7$  38.  $g(x) = 5x^2 - 25x + 12$

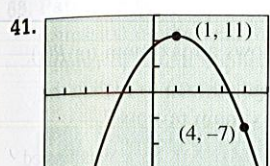
In Exercises 39–42, write an equation for the parabola shown, using the fact that one of the given points is the vertex.



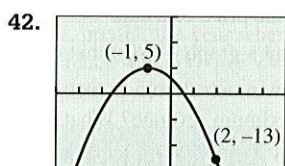
$[-5, 5]$  by  $[-15, 15]$



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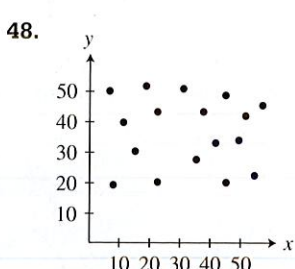
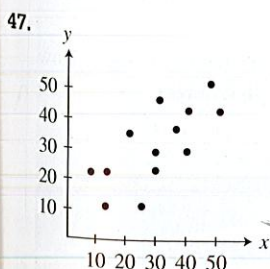
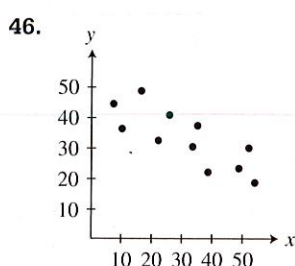
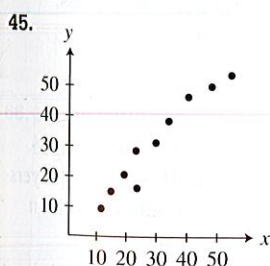


$[-5, 5]$  by  $[-15, 15]$

In Exercises 43 and 44, write an equation for the quadratic function whose graph contains the given vertex and point.

43. Vertex  $(1, 3)$ , point  $(0, 5)$   
 44. Vertex  $(-2, -5)$ , point  $(-4, -27)$

In Exercises 45–48, describe the strength and direction of the linear correlation.



49. **Comparing Age and Weight** A group of male children were weighed. Their ages and weights are recorded in Table 2.4.



Table 2.4 Children's Age and Weight

Age (months)	Weight (pounds)
18	23
20	25
24	24
26	32
27	33
29	29
34	35
39	39
42	44

- (a) Draw a scatter plot of these data.  
 (b) **Writing to Learn** Describe the strength and direction of the correlation between age and weight.
50. **Life Expectancy** Table 2.5 shows the average number of additional years a U.S. citizen is expected to live for various ages.



Table 2.5 U.S. Life Expectancy

Age (years)	Life Expectancy (years)
10	67.4
20	57.7
30	48.2
40	38.8
50	29.8
60	21.5
70	14.3
80	8.6

Source: U.S. National Center for Health Statistics, Vital Statistics of the United States.

- (a) Draw a scatter plot of these data.  
 (b) **Writing to Learn** Describe the strength and direction of the correlation between age and life expectancy.

51. **Straight-Line Depreciation** Mai Lee bought a computer for her home office and depreciated it over 5 years using the straight-line method. If its initial value was \$2350, what is its value 3 years later?
52. **Costly Doll Making** Patrick's doll-making business has weekly fixed costs of \$350. If the cost for materials is \$4.70 per doll and his total weekly costs average \$500, about how many dolls does Patrick make each week?